

IN THE CLAIMS:

Claims 1, 4, and 6-8 have been amended, and new claims 9-15 have been added as follows:

1. (Currently Amended) A background noise eliminating apparatus, comprising:

an envelope detector that detects an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

a section detector that detects a section during which a slope of the envelope detected by said envelope detector [[takes]] equals a value in a predetermined range including "0" [[during]] for at least a predetermined time [[or longer]];

a determining device that determines a background noise component value in accordance with sample data of the impulse response waveform during the section detected by said section detector; and

a background noise component eliminator that reduces an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said determining device.

2. (Currently Amended) A background noise eliminating apparatus, comprising:

an envelope detector that detects an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform;

a section detector that detects a section during which a slope of the envelope detected by said envelope detector [[takes]] equals a value in a predetermined range including "0" [[during]] for at least a predetermined time [[or longer]];

a subtracting device that determines a DC offset component value in

accordance with sample data of the impulse response waveform during the section detected by said section detector, and subtracts the DC offset component value from the sample data of the impulse response waveform;

a determining device that determines a background noise component value in accordance with the sample data, during the section detected by said section detector, of the impulse response waveform reduced by the DC offset component value by said subtracting device; and

a background noise component eliminator that reduces an absolute value of the sample data of the impulse response waveform subtracted by said subtracting device by the DC offset component value, by the background noise component value determined by said determining device.

3. (Original) A background noise eliminating apparatus according to claim 1, wherein said determining device determines a value of a maximum sample data having a largest absolute value among the sample data of the impulse response waveform during the section detected by said section detector, as the background noise component value.

4. (Currently Amended) A background noise eliminating apparatus, comprising:

envelope detecting means for detecting an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

section detecting means for detecting a section during which a slope of the envelope detected by said envelope detecting means [[takes]] equals a value in a predetermined range including "0" [[during]] for at least a predetermined time [[or longer]];

determining means for determining a background noise component value in accordance with sample data of the impulse response waveform during the section detected by said section detecting means; and

background noise component eliminating means for reducing an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said determining means.

5. (Currently Amended) A background noise eliminating apparatus, comprising:

envelope detecting means for detecting an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform;

section detecting means for detecting a section during which a slope of the envelope detected by said envelope detecting means [[takes]] equals a value in a predetermined range including "0" [[during]] for at least a predetermined time [[or longer]];

subtracting means for determining a DC offset component value in accordance with sample data of the impulse response waveform during the section detected by said section detecting means, and subtracting the DC offset component value from the sample data of the impulse response waveform;

determining means for determining a background noise component value in accordance with the sample data, during the section detected by said section detecting means, of the impulse response waveform reduced by the DC offset component value by said subtracting means; and

background noise component eliminating means for reducing an absolute value of the sample data of the impulse response waveform subtracted by said subtracting means by the DC offset component value, by the background noise

component value determined by said determining means.

6. (Currently Amended) A background noise eliminating apparatus according to claim [1] 5, wherein said determining means determines a value of a maximum sample data having a largest absolute value among the sample data of the impulse response waveform during the section detected by said section detecting means, as the background noise component value.

7. (Currently Amended) A background noise eliminating method, comprising the steps of:

(a) detecting an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

(b) detecting a section during which a slope of the envelope detected by said step (a) [[takes]] equals a value in a predetermined range including "0" [[during]] for at least a predetermined time [[or longer]];

(c) determining a background noise component value in accordance with sample data of the impulse response waveform during the section detected by said step (b); and

(d) reducing an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said step (c).

8. (Currently Amended) A storage medium storing a program, which a computer executes to realize a background noise eliminating process, comprising the instructions of:

(a) detecting an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

(b) detecting a section during which a slope of the envelope detected by said instruction (a) [[takes]] equals a value in a predetermined range including "0"

[[during]] for at least a predetermined time [[or longer]];

(c) determining a background noise component value in accordance with sample data of the impulse response waveform during the section detected by said instruction (b); and

(d) reducing an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said instruction (c).

9. (New) A background noise eliminating apparatus, comprising:  
an envelope detector that detects an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

a section detector that detects a section during which a slope of the envelope detected by said envelope detector remains near zero for at least a predetermined time;

a determining device that determines a background noise component value in accordance with sample data of the impulse response waveform during the section detected by said section detector; and

a background noise component eliminator that reduces an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said determining device.

10. (New) A background noise eliminating apparatus, comprising:  
an envelope detector that detects an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform;

a section detector that detects a section during which a slope of the envelope detected by said envelope detector remains near zero for at least a predetermined

time;

a subtracting device that determines a DC offset component value in accordance with sample data of the impulse response waveform during the section detected by said section detector, and subtracts the DC offset component value from the sample data of the impulse response waveform;

a determining device that determines a background noise component value in accordance with the sample data, during the section detected by said section detector, of the impulse response waveform reduced by the DC offset component value by said subtracting device; and

a background noise component eliminator that reduces an absolute value of the sample data of the impulse response waveform subtracted by said subtracting device by the DC offset component value, by the background noise component value determined by said determining device.

11. (New) A background noise eliminating apparatus according to claim 9, wherein said determining device determines a value of a maximum sample data having a largest absolute value among the sample data of the impulse response waveform during the section detected by said section detector, as the background noise component value.

12. (New) A background noise eliminating method, comprising the steps of:

(a) detecting an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

(b) detecting a section during which a slope of the envelope detected by said step (a) remains near zero for at least a predetermined time;

(c) determining a background noise component value in accordance with

sample data of the impulse response waveform during the section detected by said step (b); and

(d) reducing an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said step (c).

13. (New) A storage medium storing a program, which a computer executes to realize a background noise eliminating process, comprising the instructions of:

(a) detecting an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

(b) detecting a section during which a slope of the envelope detected by said instruction (a) remains near zero for at least a predetermined time;

(c) determining a background noise component value in accordance with sample data of the impulse response waveform during the section detected by said instruction (b); and

(d) reducing an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said instruction (c).

14. (New) A background noise eliminating apparatus, comprising:

an envelope detector that detects an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform including background noise;

a section detector that detects a section during which a slope of the envelope detected by said envelope detector remains steady for at least a predetermined time;

a determining device that determines a background noise component value in accordance with sample data of the impulse response waveform during the section detected by said section detector; and

a background noise component eliminator that reduces an absolute value of the sample data of the impulse response waveform by the background noise component value determined by said determining device.

15. (New) A background noise eliminating apparatus, comprising:

an envelope detector that detects an envelope of an impulse response waveform from a sample data sequence of the impulse response waveform;

a section detector that detects a section during which a slope of the envelope detected by said envelope detector remains steady for at least a predetermined time;

a subtracting device that determines a DC offset component value in accordance with sample data of the impulse response waveform during the section detected by said section detector, and subtracts the DC offset component value from the sample data of the impulse response waveform;

a determining device that determines a background noise component value in accordance with the sample data, during the section detected by said section detector, of the impulse response waveform reduced by the DC offset component value by said subtracting device; and

a background noise component eliminator that reduces an absolute value of the sample data of the impulse response waveform subtracted by said subtracting device by the DC offset component value, by the background noise component value determined by said determining device.